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ABSTRACT

Twelve publications already in the ERIC system that deal with microcomputers were selected for annotation. Two of the publications are conference proceedings that explore the use of computers. Another two are administrator handbooks dealing with the acquisition and the use of computers. Reference works cited include a guide for instructional packages, a manual for instructional use, a review of educational software, and a microcomputer state-of-the-art article. Other topics are the dreams and realities of microcomputers in classrooms and securing teacher acceptance of technology. The remaining two entries contain reassuring words on the simplicity of classroom computers and computer purchasing advice. Information for ordering copies of the items reviewed is supplied. (MLF)

# THE BEST OF ERIC ON EDUCATIONAL MANAGEMENT

Number 69, March 1983

*The Best of ERIC* presents annotations of ERIC literature on important topics in educational management.

The selections are intended to give educators easy access to the most significant and useful information available from ERIC. Because of space limitations, the items listed should be viewed as representative, rather than exhaustive, of literature meeting those criteria.

Materials were selected for inclusion from the ERIC catalogs *Resources in Education (RIE)* and *Current Index to Journals in Education (CIJE)*.

ERIC Clearinghouse on Educational Management

# Microcomputers and Instruction

1 **Becker, Henry Jay.** *Microcomputers in the Classroom—Dreams and Realities. Report No. 319.* Baltimore: Center for Social Organization of Schools, Johns Hopkins University, January 1982. 82 pages. ED number not yet assigned.

Numerous educators, computer scientists, and social commentators have described at length the desirable educational "dreams" that microcomputers might help bring true. Becker's focus here is not on these dreams, however, but instead on what he calls the "realities" of microcomputer use in the schools.

Using much of the same data that microcomputer enthusiasts marshall to advance the use of computer-assisted instruction (CAI), Becker builds a largely negative view of the future use of microcomputers for instruction. But even though Becker's arguments are sometimes weak, his point of view provides a valuable counterweight for the overabundance of literature describing the future ecstasies of CAI. A reading of this document is sure to prod enthused educators into a careful thinking through of their plans for CAI before taking action.

Becker discusses several major instructional uses of microcomputers. Teachers can use microcomputers to manage the instructional process, or can utilize microcomputers to teach students in one or more modes: drill and practice, tutorial, simulation, model-building, or problem solving. Microcomputers can also be used to teach "computer-related information skills," as well as computer programming.

Among the major problems that Becker sees are the cost of computer hardware, the lack of quality instructional software, the lack of computer literacy and programming skills among educators, and the possibility that too much CAI will cause a deterioration of students' social skills. The author also discusses aspects of the social organization of computer use in schools, such as whether to centralize a schools' computers or distribute them to classrooms, and the possibility of small group instruction with computers.

2 **Dresden Associates.** *School Microware Reviews. Evaluations of Educational Software for Apple, PET, TRS-80, with Index to Evaluations in Other Publications.* Dresden, Maine: 1981. 68 pages. ED 213 389.

Ten years ago, the number one barrier to the widespread use of computer-assisted instruction (CAI) was the cost of the computers themselves. Since the advent of the "microcomputer revolution" in '75, however, cost has been effectively removed as the primary barrier to CAI. Today, this publication states, "most persons involved in instructional application of microcomputers will agree that the number one problem facing this field is software quality."

To help solve this problem it is essential that existing instructional software for microcomputers (microware) be reviewed and evaluated on a regular basis. This publication—the first issue of an intended biannual journal—is designed to provide this needed evaluation.

An initial section contains reviews of fifty microcomputer programs that are available for use on the Apple II, Commodore PET, and Radio Shack TRS-80. (Future editions will contain reviews of software for other systems.) Each review consists of a description of the program and a detailed evaluation.

A second section indexes the reviews of nearly 300 additional microcomputer programs to the journals in which they are reviewed. According to the authors, this is the most comprehensive such index published to date. A final section introduces readers to the "User Software Review Program," which will eventually provide the bulk of evaluative input for this new and much-needed journal.

3 **ERIC Clearinghouse on Educational Management.** *The Computer: Extension of the Human Mind.* Proceedings of the Third Annual Summer Conference, College of Education, University of Oregon. Eugene, Oregon: ERIC/CEM, July 1982. 236 pages. ED number not yet assigned.

Administrators deciding to incorporate computers into their schools' instructional programs need to consider more than the selection of hardware, software, and inservice training programs. Authors of several of the twenty-two papers included in this volume of conference proceedings point out that the advent of the microcomputer will lead to sweeping changes in education and in society as a whole. Treating computers simply as sophisticated tools for speeding up the handling of traditional problems approached in traditional ways is clearly a mistake.

Rob Kling claims that if computers are to be successfully integrated into the school's program the educator must avoid accepting a prepackaged definition of computer literacy. Each school system must conceive of computer literacy in terms of its vision of schooling. Only then is it appropriate to select the hardware and software that can best support these broad educational goals.

In Alfred Bork's view of the future, students nationwide will have off-campus access to brilliant teaching through carefully developed

computerized instructional programs. He cautions that teachers must prepare for these drastic changes in education and argues forcefully that teaching students BASIC can destroy their ability to learn more useful computer languages later.

Henry F. Olds, Jr.—pointing to the presence in the school of a "hidden curriculum" —argues that computer-assisted instruction (CAI) all too often carries the hidden lesson that learning is a step-by-step, linear, isolated activity calling for the suspension of normal interpersonal dialog, and involves adapting the learner's behavior to meet outside expectations rather than developing internally directed creativity.

Topics of other articles include providing learner control in computerized educational activities, combining microcomputers and videodiscs to deliver CAI to mentally handicapped students, providing career information, and teaching introductory computer classes.

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4 **Forman, Denyse; Crawford, Stuart; and Tennant, Ross.** *Reference Manual for the Instructional Use of Microcomputers. Volume I (Release II).* Victoria, British Columbia: JEM Research, 1981. 873 pages. ED 208 849.

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Looking for a comprehensive guide to instructional software for your school or district's Apple II microcomputers? If so, this lengthy reference manual will more than fill the bill. (Presumably, later volumes of this manual will cover instructional software for other microcomputers.)

The first section of this publication is an annotated index of more than 700 instructional software (or courseware) programs currently available for the Apple. Information provided for each program includes the publisher, a brief description of its purpose or operation, the grade level it was designed for, and its cost. The programs are grouped into sixteen general categories to facilitate location of suitable courseware.

Section II, weighing in at 332 pages, contains reproductions of courseware catalogs from 63 manufacturers and distributors. Section III is an alphabetized list of these companies plus 150 other companies selling computer products.

Section IV, by far the most valuable part of this manual, contains evaluations of at least one of the courseware programs offered by each of the manufacturers in Section II. Programs reviewed range from short drill-and-practice or game programs to long series of programs on math, spelling, or reading. The reviews, ranging from one paragraph to numerous pages, include information on programming, language used, peripherals needed for operation, memory requirements, grade level of programs, and documentation included with program.

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5 **Gleason, Gerald T.** "Microcomputers in Education: The State of the Art." *Educational Technology*, 21, 3 (March 1981), pp. 7-18. EJ 244 284.

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What is the current state of the computer revolution in education? To find out, Gleason arranged a series of indepth visitations to numerous public schools, the Minnesota Educational Computing Consortium (MECC), and three universities. In this well-written article, he sums up his findings and speculates on the future of computer-assisted instruction (CAI).

As far as computer hardware is concerned, "micros are the wave of the near future." Despite their prevalence, however, micros will not entirely displace traditional time-share instructional systems such as PLATO, which are also growing in popularity. In the future, Gleason projects, micros and time-share systems will probably be linked into large instructional networks.

In contrast to the glowing state of hardware development, the production and dissemination of CAI software "is at a very awkward stage." Producing quality software is an expensive and involved procedure and many software producers have opted to market their instructional software programs before they are proven. But more and more quality software is appearing as the science of instructional design advances and as the expanding educational market makes greater investment possible.

Gleason also examines the current state of research on CAI. Among his findings are that CAI learning is 20 to 40 percent "faster" than conventional instruction, that students "react very positively to good CAI programs" while rejecting poor programs, and that retention following CAI is at least as good as that following conventional instruction.

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6 **Lazarus, Mitchell.** "So Complicated, They're Simple: A Reassuring Word on Classroom Computers." *Principal*, 62, 2 (November 1982), pp. 38-41. EJ number not yet assigned.

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Perhaps the most uncomfortable aspect of microcomputer-based instruction is the "loss of control" experienced by educators when computers instruct students. But loss of control may actually work to the benefit of educators, Lazarus claims. In this intriguing article, he draws an extended analogy between computer and automobile technologies and in so doing shows how "loss of control" sets computers "apart from every educational technology of the past" and "stands to make them uncommonly practical and effective" as instructional tools.

Around the turn of the century, only dedicated "automobilists" with specialized tools and knowledge used—or could use—cars. As the automobile market expanded, though, manufacturers made cars more reliable, easier to use, and, as a consequence, much more complicated. The added complications were deliberately designed to "isolate the driver from both the car's machinery and the road" so that just about anyone could drive.

An exactly analogous development has occurred in the computer industry. Starting and running an instructional program is

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now as simple as starting and driving a car, while the software and hardware are more complicated than ever. Educators do not need to know how to program or how the computer works. Once an instructional program is running, though, the teacher becomes a "passive spectator" to the computer-managed lesson.

But "so long as the computer is doing on its own more or less what the teacher would want it to do," Lazarus concludes, this loss of control over the details of operation is unimportant. By carefully evaluating and sequencing the software students use, educators can have as much actual control over computer-based instruction as they now have over traditional instruction.

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7 **Lidtke, Doris K.** "Securing Teacher Acceptance of Technology." Paper presented at the National Conference on Technology and Education, Washington, D.C., January 1981. 22 pages. ED 208 871.

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No matter how promising the instructional use of microcomputers looks, administrators can't successfully implement a computer-assisted instruction (CAI) program without the full cooperation of teachers. Unfortunately, teachers sometimes resist the implementation of CAI for a variety of psychological and political reasons. What, then, asks Lidtke, "can administrators and educational leaders do to encourage the use of computers in classrooms?"

The first step is to gain an understanding of why teachers may resist CAI. Some possible reasons for resistance, says Lidtke, are the belief that computers may replace teachers, lack of knowledge about computers, feeling that computers will deliver depersonalized education, feelings of loss of control of the teaching process, and anxiety in dealing with computer equipment.

As can be seen, most of these reasons stem from a general lack of familiarity and understanding of the operation and potential of computers. Thus, the key administrative approach to gaining teacher acceptance is to provide training in CAI and related areas. This training should show teachers that computers are simply sophisticated classroom tools — not teacher replacements. Lidtke also recommends that teachers be given opportunities to see computers being successfully used for CAI. This approach "should allay misgivings and motivate teachers to consider using computers in their own classrooms."

Teachers should also be given adequate training in the actual use of computers in the classroom. The amount of training needed by individual teachers will vary widely, Lidtke notes, depending on previous training and extent of the planned CAI program. Other suggestions for securing teacher acceptance of CAI include the provision of adequate — not token — equipment for the classroom, the provision of quality software, and the availability of a specialist on CAI.

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8 **Northwest Regional Educational Laboratory.** *Evaluator's Guide for Microcomputer-Based Instructional Packages.* Portland, Oregon: 1981. 61 pages. ED 206 330.

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Knowledgeable educators have been calling for years for a national clearinghouse on educational software, particularly for software intended for instructional use on microcomputers. In 1979, this wish came true with the establishment at the Northwest Regional Educational Laboratory of "MicroSIFT" (Microcomputer Software and Information for Teachers). An essential part of MicroSIFT is a network of large school districts and regional consortia that have full-time instructional computing staffs. The schools in this network serve as the evaluators of courseware initially screened by the central MicroSIFT staff.

But what about teachers and administrators interested in evaluating their own courseware, or courseware not yet evaluated MicroSIFT? For these educators, MicroSIFT has now made available this evaluator's guide, which shows step by step how to describe and evaluate any microcomputer courseware product.

The first step in the evaluative process is to acquire some factual data about the courseware. Descriptive information needed includes grade or ability level, required hardware, required software not included in the package, instructional objectives and prerequisites, user's role, instructional strategy, and program structure.

Sample forms are provided for both the courseware description and for the second step in the process — the actual evaluation. Twenty-one items for evaluation are listed and thoroughly explained. Items include the accuracy of the content; its educational value and freedom from social, ethnic, or sexual stereotypes; whether feedback from the learner is used effectively; how much control of rate and sequence the learner has; how comprehensible and effective the user support materials are; and how easily the instruction can be integrated with previous student experience.

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9 **Northwest Regional Educational Laboratory.** *Microcomputers in Today's Schools: An Administrator's Handbook.* Portland, Oregon: 1981. 258 pages. ED 213 393.

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Does computer-assisted instruction (CAI) really improve student achievement? According to research reviewed in this handbook nearly every study conducted to date "finds that traditional instruction, supplemented by CAI, leads to higher achievement than traditional instruction alone." Moreover, most studies of CAI "find that CAI students have a better attitude toward the subject matter" and complete the same material in less time than students receiving traditional instruction alone.

Besides reviewing recent research on CAI, this diverse assemblage of articles, CAI profiles, and resource lists provides a wealth of useful information for administrators contemplating the utilization of microcomputers for instruction. For example, one article discusses the process of acquiring computer facilities, including the all-important steps of justifying the procurement of computers and conducting a needs assessment. Advice on acquisition is proferred according to the responsible administrator's experience and knowledge level, whether low, medium, or high. Other articles discuss management applications of microcomputers, the usefulness of computers and other types of electronic technology for teaching basic skills, and the state of the art in using computers to teach the handicapped.

Also provided are profiles of eight schools or school districts in the Northwest that have successfully operating CAI programs. "For an educator who is considering implementation of some microcomputer-oriented applications in school(s)," the authors note, "the single most important piece of advice offered by users is to plan an intensive on-site visit to a school or district where the application is currently in use."

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10 **Pogrow, Stanley.** "Avoiding 'Micro' Pitfalls." *School Administrator*, 39, 7 (July-August 1982), front cover, pp. 12-13. EJ 265 740.

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When considering the purchase of microcomputers for a school's instructional program, the astute administrator should first locate good quality computer programs (software) that meet the defined needs of the district. The computer hardware should be selected *after* the software, because good software can only run on certain microcomputers. "Therefore," says Pogrow, "once you have selected the software, you have in effect selected the micro."

This is just one of many valuable pieces of advice Pogrow offers to help administrators avoid problems common to microcomputer purchase and implementation. Pogrow also provides suggestions on software evaluation, data storage, microcomputer servicing,

discounts on hardware purchases, budgeting for support costs, and choosing reliable vendors.

For example, Pogrow cautions administrators to be distrustful of what sellers say their software will do. "The key to selecting software is to first observe it in action and then spend time practicing using it." In particular, he urges, "make as many input errors as you possibly can," because poorly designed programs will "freeze" if incorrect entries are made.

Purchasers should also consider the cost of procuring multiple copies of instructional software. Some vendors sell software on a per copy basis, whereas others essentially sell a software "license" that allows users to make copies as needed.

Pogrow also warns about other support costs associated with microcomputer procurement, such as facility preparation, security, and, especially, service. In general, only two-thirds of the money budgeted for micros should be spent on hardware. Giving in to the temptation to "maximize the amount of equipment purchased" can lead to a situation where the computers are not used at all.

11 **Watson, Nancy A.,** editor. *Microcomputers in Education: Getting Started. Conference Proceedings.* Tempe: College of Education, Arizona State University, 1981. 349 pages. ED 205 216.

Where can external funding for the purchase of microcomputers be found? Why is computer literacy so important, and how can it be taught? How can good instructional software be located and evaluated?

If questions like these have surfaced as you've considered the implementation of a computer-assisted instruction (CAI) program, you are certainly not alone. Fortunately the answers to many of these questions can be found in this publication, which contains thirty-eight articles on getting started in microcomputer-based education. Based on presentations made at a recent conference for elementary and secondary school administrators and teachers, these one- to thirty-page articles address many of the most critical problems facing the field of CAI today.

Opening articles discuss a variety of topics related to CAI: the importance of computer literacy in the 1980s, the computer literacy curriculum, instructional management with microcomputers, microcomputers in the elementary classroom, finding good software through "MicroSIFT" and other software clearinghouses, guidelines for writing good instructional software, and potential sources of funding for the purchase of microcomputers.

Most of the articles, though, are devoted to the use of microcomputers in specific instructional areas, including English, math, business education, music, computer programming, science, special education, and gifted education.

12 **Wilson, Kara Gae.** "Administrative Guidelines for Introducing Computers into the Curriculum." *NASSP Bulletin,* 66, 455 (September 1982), pp. 6-11. EJ number not yet assigned.

Integrating computers into the curriculum can be a confusing and even a frightening endeavor, given the significant sums of money involved. But it needn't be so. With the handful of solid, sensible ideas provided here by Wilson, bringing computers into a secondary school can be a smoothly coordinated undertaking.

To begin with, Wilson stresses, administrators should identify school personnel who are willing and interested in using computers in the classroom. Find out which teachers are taking computer courses in the evenings and which teachers have personal computers at home. When a teaching position opens up, "make a point to hire someone who has computer experience, has taken a course, or is at least open to training."

Once one or more interested faculty members have been identified, they should be given some formal training in computer-assisted instruction (CAI). When teaching begins, it should "start small" with a computer club, perhaps, until the teachers have gained confidence and knowledge in this new area. Next, the administrator should conduct preenrollment surveys, both to gauge student interest and to "force computer instructors to determine exactly what courses they are comfortable teaching."

Only after the above steps have been taken should administrators purchase computer equipment. Wilson advises a "shop and compare" approach, with particular attention paid to available repair services, expansion of existing equipment, and special features.

Once CAI has begun, administrators should see to it that "computers do not become the exclusive domain of one department (usually math), or one student level (usually honor student)." The best way to avoid such exclusivity is to involve additional faculty in the use of computers as soon as possible.

This article is one of sixteen in this edition of *NASSP Bulletin* dealing with computers in education. Other authors discuss such issues as "microliteracy" for administrators, the process of selecting computer software, assuring the success of a microcomputer implementation program, and motivating teachers to use computers in the classroom.

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